Detailed Comments by the U.S. Environmental Protection Agency
on the
Draft Environmental Impact Statement for the
Remediation of the Moab Uranium Mill Tailings
Grand and San Juan Counties, Utah

A. Description of the Proposed Action: DOE has been given responsibility for the now-abandoned Moab uranium mill tailings site near Moab, Utah. These tailings consist of approximately 12 million tons of previously milled uranium ores which contain radioactive materials that exceed concentrations limits set to protect human health as established in 40 CFR 192. DOE intends to take action to remediate the Moab site in accordance with UMTRCA Title 1. DOE is proposing to: 1) remediate these approximately12 million tons of contaminated material, 2) remediate about 40,000 tons of contaminated material located in Moab, known as 'vicinity properties' consisting primarily of residential and commercial buildings in the Spanish Valley, and 3) to develop a ground water remedy to clean up the contaminated ground waters underlying the tailings site. The alternatives analyzed in detail include either on-site or off-site locations to place these contaminated materials in a secure location. DOE needs to demonstrate for these remedies that the disposal cell cover and liner, institutional controls, and custodial care as required under UMTRCA, would be capable of providing long-term protection for at least 200 years or longer

B. Environmental and human health risks if no action is taken: The information provided by DOE, the National Academy of Sciences, and others demonstrated that a remedy must be capable of providing reliable long-term protection for people and the environment. If the tailings pile were left in place without remediation, the pile could emit radon gas, causing human health risks on-site.

For stream water quality, the primary contaminant of concern at the tailings pile includes uranium and ammonia. Uranium concentrations above 5 mg/L can occur in the river near Moab Wash which is about one hundred times the EPA-established requirement for uranium in drinking water of 0.044 mg/L (30 pCi/L). Ammonia currently exceeds 1000 milligrams per liter (mg/L) in ground water and at times exceeds 300 mg/L in river backwater areas which is toxic at times to native and endangered fish. These concentrations exceed by a factor of 100 the aquatic toxicity criteria for ammonia, which is 3.0 mg/L based on the hardness, temperature and alkaline pH of the Colorado River. The pile, without remediation, is likely to leach ammonia in toxic concentrations to aquatic life for centuries or even up to 1500 years.

C. Comments of the application of certain regulatory requirements. In 1982, EPA produced the *Final Environmental Impact Statement for Remedial Action Standards for Inactive Uranium Processing Sites* to support the standards in 40 CFR 192 (EPA 520/4-82-013-1). This Final EIS document will be referred to as the 40 CFR 192 EIS. DOE, the Nuclear Regulatory Commission, and other federal agencies reviewed and commented on the Draft of the 1982 EIS. In many cases, statements and risks as presented in the Moab EIS differ significantly from the 40 CFR 192 EIS regarding application of the 40 CFR 192 standards. We suggest that the DOE's Final EIS for Remediation on the Moab Uranium Mill adopt the same procedures and conclusions used to calculate human cancer risks as presented in EPA's 40 CFR 192 EIS.

Section 112 of the Clean Air Act is the legislative authority used by EPA to establish the National Emissions Standards for Hazardous Air Pollutants (NESHAPS). The Draft EIS indicates that NESHAPS requirements for radon flux do not apply during active remediation. NESHAPS requirements under 40 CFR 61 Subpart Q does not apply after final disposal or during periods of active remediation for Title II sites. However, Subpart T of the NESHAPS requirements is applicable two years after a Title I uranium mill site has become inactive (See 40 CFR 61.220 and 61.222 (b)). The Moab Uranium Mill tailings pile has been inactive and under DOE's authority for longer than two years. The Subpart T rule states that such tailings piles are required to meet the 20 pCi/m^2-s Radon (Rn-222) flux standard unless a compliance agreement is reached because it is not physically possible for the owner or operator to complete disposal within the two-year time frame. DOE=s selection and implementation of its remedy to be defined in the Final EIS and the eventual ROD would likely satisfy the latter condition. It should also be noted the DOE is in compliance with Order 5400.5 as described in the Moab Annual Site Environmental Report (DOE-EM/GJ677-2004).

The calculation of radon daughter concentrations above the pile may not be consistent with 40 CFR 192 methods. The radon concentration above the pile is listed as being at 0.096 working level (WL) which corresponds approximately to 21 pCi/L of radon gas. Were both of these numbers the result of samples, or was an Equilibrium Ratio (ER) assumed? If an ER was assumed, it may not be valid. An ER of 0.45 above a tailings pile appears to be large since the samples were collected at a location where the radon decay daughters would have been removed when air migrates out of the tailings. Stripping of the radon daughter products should result in a lower ER as described in the 40 CFR 192 EIS. See page 46 of that EIS regarding in growth of radon decay products.

Department of Transportation (DOT) Transport Exemption. On January 26, 2004, the DOT changed the hazardous materials transportation rules as described at 49 CFR 171, 172 et al. Compliance with this new rule may mean that the Moab uranium mill tailings will have to be transported as Class 7 material. If the current exemption for these mill tailings from Class 7 material transport rules is no longer valid, this would increase the cost and time, due to the limited availability of Class 7 shipping containers. DOE should verify whether the current DOT hazardous waste transport exemption is still in effect under this new rule and state this in the Final EIS and recalculate costs and schedules accordingly.

D. Comments on the Alternatives

1) Cap-in-Place On-site Because the tailings pile may continue to serve as a source of contamination for several hundred years, it will be difficult to achieve the remediation target goal in 80 years. The uncertainty of length of time needed for completion of the ground water clean-up remedy on-site should be clearly stated as part of DOE's upcoming decision to select a preferred alternative.

The key assumption used to estimate drainage from the tailings pile is that the infiltration rate after construction of the cap will be $1x10^{-8}$ centimeters per second (cm/s.) Other similarly constructed caps have shown that this low infiltration rate is difficult to engineer and maintain and therefore is likely to be higher. If the rate of infiltration through the cap is a magnitude greater, at $1x10^{-7}$ cm/s, drainage from the tailings pile will be an order of magnitude greater, significantly affecting the estimates of the impacts of the tailings pile on ground water contaminant concentrations. The result will be much higher concentrations in ground water, which may adversely impact surface water after the projected 80-year operation period for the ground water remediation system. The Draft EIS indicates that the infiltration rate through the tailings will decrease from the current conditions to 10^{-8} cm/s following construction of a cover. This would suggest that the gravity drainage would decrease from an estimated 8 gpm to 0.8 gpm with resulting transient drainage decreasing from the present estimate of 12 gpm to having no transient drainage within 20 years. Constructing a cover on the site meeting these hydraulic conductivities is problematic based on monitoring of other similar covers over time.

Long-term risks to maintaining pile stability without remediation are due to the well-established risk of river flooding. Four flood events since the 1880s had a river stage high enough to inundate a portion of the tailings pile. As noted in our cover letter, river flooding is a significant long-term management problem that is compounded by unstable geologic conditions associated with possible river migration and dissolution of the underlying salt-beds. EPA concludes that selection of an off-site remedy, which would avoid these geologic uncertainties, is needed in order to secure that DOE's long-term protection goals be achieved.

A very large flow event in Moab Wash may compromise long-term pile integrity. A probable maximum flood (PMF) in Moab Wash could occur during the summer rather than late spring snow-melt affected conditions which are more typical of Colorado River flooding conditions. We suggest the Final EIS provide more information than that provided which indicates that such flood flow velocities would be quite low over the Moab Wash bank. In the event of a such a catastrophic storm event in the Moab drainage basin, flows in Moab Wash could cause a re-routing of this stream channel and may undermine and potentially remove a portion of the engineered pile. Tailings and debris from the flood would be deposited on river banks and along sandbars immediately down-gradient from the confluence of Moab Wash and the Colorado River.

2) Klondike Flats Alternative Site: This site does not have geologic uncertainties like that on-site. The Klondike Flats location has a depth to groundwater protected by approximately 1000 feet of the impermeable Mancos Shale. Constructing the optional slurry line to transport the Moab tailings would reduce the highway safety concerns, but does not eliminate them, because a substantial portion of the tailings may prove to be unsuitable for slurry transport. This could require significantly more truck transport for the slurry line not considered by DOE. The site has some environmental concerns due to conflicts with recreational vehicles within the same valley. Borrow materials for cover material will need to be hauled from locations on BLM lands.

3) Crescent Junction Alternative Site: This site also lacks the problems with future geologic uncertainties like that on-site. The Crescent Junction location also has suitable depth to groundwater protected by approximately 4000 feet of impermeable Mancos Shale. Although rail transport requires a longer haul than the Klondike site, this does not increase cost significantly, as the costs are principally related to the conveyer operational costs associated with loading and unloading material. Rail transport to Crescent Junction can use the existing separate grade crossings under US-191 and Interstate 70. This site has an environmental advantage compared to other sites because suitable cover material can be obtained at the proposed cell location resulting in less land disturbance.

4) White Mesa Mill Alternative Site: The White Mesa site is overlain by wind-blown soils and there is a perched ground water table in the Burro Canyon Formation immediately underlying the site. DOE proposes waste cells to meet UMTRCA standards. EPA does not object to the application of UMTRCA requirements for geologically suitable site conditions. However, this site will require significant improvements to the proposed waste cell design in order to assure long-term compliance with the more rigorous ground water protection requirements of the State of Utah. For example, the design that is presently being employed for the reconstruction of disposal cell 4A would meet the groundwater protection regulations for the state of Utah.

Transportation concerns and long-term risks to ground water of this remedy, as proposed and designed, could be significant unless additional design measures are implemented. Truck transport presents a high risk of vehicular accidents. The increase in truck traffic along US-191 would be up to 1200 trucks per day resulting in almost a doubling of the truck traffic along this highway.

There will be a significant increase in ambient and night-time noise in the communities of Moab, Monticello, and Blanding. Since US-191 passes residential properties in Moab, residents in these homes could be exposed to noise levels above the Moab residential standard of 65 dBA. As haul trucks increase their speed south of Moab, the area that will experience ambient noise conditions greater than 65 dBA will be over 400 feet from the highway (Draft EIS at page 4-139.) Residents in Monticello and Blanding will also likely experience noise levels above this standard, even though speed limits are 30 mph within these communities. Because these communities now experience little nighttime disruptive noise conditions, this will result in a significant impact to these residents.

E. Comments on the Transport Alternatives:

1) Truck and Rail Transport: Alternatives to using petroleum diesel fuel – For the truck and rail transport options, DOE should investigate the environmental and equipment operational advantages of using a mixture of vegetable oil and diesel fuels known as biodiesel. Combustion of biodiesel fuels emits less carbon monoxide and offers up to a 10 to 15 percent reduction in particulates and hydrocarbon emissions compared to petroleum diesel. Using biodiesel fuels results in releasing less climate-changing CO_2 emissions based on initially capturing atmospheric carbon during oil-plant growth. Usually these fuels are produced from dry-crop farming of soy, canola or mustard seed, which do not require supplemental irrigation water. Heavy equipment run on twenty percent blend of vegetable oil and petroleum diesel, known as B20 fuel which is 20% vegetable oil and 80% petroleum diesel, has proven reliable in winter conditions with climates more severe than eastern Utah. The twenty percent blends, or lower, do not gel in severe cold. Biodiesel fuels provide engine operational advantages due to their viscosity properties which may extend engine life and reduce engine maintenance requirements. Biodiesel can also increase engine efficiency because it has a higher cetane rating than petroleum diesel. Although B20 fuel costs more than petroleum diesel fuel, a renewable energy subsidy will become effective in 2005 for blender of biodiesel fuels. This federal subsidy will provide one cent per percent of blended vegetable oil to the fuel blender companies. This means that a blender of B20 biodiesel fuels will receive a tax credit of 20 cents per gallon which could offset the cost differential so that B20 biodiesel fuel prices may then equal the cost of petroleum diesel.

2) Rail Transport: DOE has indicated that as many as 2,200 trucks would be required to transport oversized and demolition debris to the off-site alternatives. The upper size-limit constraint for a conveyor belt might be several inches to a foot in diameter. Therefore, if the pile contains additional oversized material than currently estimated, this should not be a significant issue for rail transport.

3) Slurry Transport: The average particle size is critical to operating the slurry pipeline option. The upper-size constraint for the slurry pipeline will be less than .03 inches. The amount of material unsuitable to be slurried could be a significant problem with potentially tens times as much material in the pile that must be truck-hauled if the slurry line is selected. The Final EIS should also include a thorough discussion of the uncertainties associated with the process of evaporative drying of slurried tailings in order to meet optimal moisture content for placement and compaction. Once placed into a cell, even if placed at optimal moisture content, transient drainage will continue for perhaps 25 years. If the tailings were to be placed at conditions above the optimal moisture content, then transient drainage from such tailings may extend considerably longer. Because the Mancos Shale beneath the Klondike and Crescent Junction provides much greater protection to surface and ground water than does the White Mesa site, the differences in slurry transport by alternative should be defined. DOE has estimated that the Klondike site and Crescent Junction site would provide ground water protection for upwards of 25,000 years. At the White Mesa site, it is estimated that ground water travel time to points of exposure at surface springs is estimated to be within 3,600 years. A possible discharge point is Ruin Spring, located about two miles south-southwest of the White Mesa Mill.

The possibility of pipe ruptures or leaks and potential contamination of underlying ground water and surface water resources needs to be discussed. The proposed slurry pipeline route to Klondike Flats crosses an area of shallow groundwater in the Cedar Mountain Formation. The slurry pipeline route to White Mesa crosses the Colorado River and Matheson Wetlands. Ruptures in any of these areas could result in undesirable environmental consequences and this should be addressed in the Final EIS.

F. Comments regarding groundwater remediation

1. The time frame for operating a groundwater remediation system is given as 75 years for the off-site alternatives and 80 years for the on-site alternative. EPA agrees with the estimate for the off-site alternatives, but believes the time frame for the on-site alternative should be expressed as much longer range, for example, 80 – 1000+ years considering the very large uncertainties in the concentrations leaching through the tailings pile and long time frame the tailings pile is likely to serve as a source of leachate. The 80-year time frame is intended to represent only the period needed to flush the legacy plumes and not potentially more leaching that could result if the cover failed to all subsequent additional infiltration.

2. Several long-term impacts of the on-site alternatives need to be discussed in the summary section, including:

    a. The high ammonia concentrations (one order of magnitude higher than current concentrations) that are anticipated to exit the tailings pile in approximately 1000 to 1500 years and potentially adversely impact ground and surface water concentrations for hundreds of years.

    b. The rate at which salt-bed-based dissolution subsidence under the pile could lower the pile relative to the Colorado River level which may be 1 to 1.5 foot per 1000 years. In the near term, this may lead to wetting of the base of the pile during high river stages and potentially increased contaminant concentrations entering the groundwater system. In the longer term, the subsidence will result in permanent tailings contact with the ground water.

3. The EIS addresses only ammonia standards, as these are currently the driver for surface water impacts. The assumption is made that the other constituents of concern will be reduced to acceptable levels in the same time frame as for ammonia, but no basis is provided for this assertion. The identified constituents of concern have different solution chemistries and sorptive characteristics and, consequently, are likely to have different fate and transport projections.

4. Potential to increase the rate of leachate flushing using a pond. The following option for ground water clean-up could be investigated as a means to reduce the length of time necessary to meet surface and ground water criteria. We suggest

evaluation of the advantages of creating a new hydraulic head in order to more rapidly drive the ground water plume. For the off-site alternatives, the area exposed after tailings pile removal could be designed for a shallow pond of from 4 to 6 feet. With an increased hydraulic head driving the legacy plume, the ground water and surface water quality may be able to meet standards sooner, thus reducing costs of the proposed ground water clean-up remedy.

G. Comments regarding the cell cap design:

DOE should emphasize that the assumptions related to capping performance for on-site remedy critically affect the estimated time to achieve the ground water remedy. The critical assumption to constructing and then maintaining the cover to assure hydraulic conductivity remains at the 10^{-8} cm/sec infiltration limitation. If this is not assured, contaminants may leach into ground water at a significantly higher rate and persist longer than currently predicted by DOE.

The advantages of a waste cell cap design based on achieving a water balance through soil and vegetative evapo-transpiration (ET) should be investigated. DOE participated with EPA and the State of Utah in the final design and construction of an ET-water balance cover for the Monticello Mill Tailings Site. EPA's Alternative Cover Assessment Program, a program that DOE has participated in, has also shown the advantage of similar type construction in semi-arid environments. We believe that the 10^{-8} cm/s hydraulic conductivity that DOE needs to attain on the cover for the cap-in-place alternative is more likely to be assured with an ET - water balance cover.

EPA studies in the ACAP program have suggested that constructing covers with compacted clay liners to achieve hydraulic conductivities of 10^{-7} cm/s has been difficult, requires extensive QA/QC, and in the long term may be problematic. Will there be lysimeters or other moisture probes in the cover to determine if the necessary saturated hydrologic conductivity and or flux through the cover is being met? Although the initial UMTRA program requirements included predictive modeling methods must show success, the latest revision of DOE's Technical Approach Document (page 220) recognized that monitoring of the cover to assure that performance criteria were met might also be necessary.

Evidence from the Monticello water balance - ET cover, indicates that the hydraulic conductivity has met or exceeded the design criteria. The Monticello cover performance data shows that the NESHAPS requirements for radon emissions were adequately met following placement and compaction of the vicinity property material. The clay barrier constructed over the vicinity property material provided redundant protection for radon emissions.

The need for a bio-intrusion barrier will depend upon the risks to cover integrity from the terrestrial rodent species present and any other rodent species which might occupy the area following completion of waste disposal cell. What additional studies will DOE conduct before making a decision as to whether or not a bio-intrusion barrier will be required? Should a bio-intrusion barrier be required, then additional rock material (cost and transportation impacts) has not been considered in the present scenarios. In addition, if construction of capillary barrier in a six-inch lift across the entire cover appears to be prohibitive due to constructability problems, then perhaps a one-foot lift would be required to meet the performance goals assumed in the design. Based on EPA's review of the conceptual design, as much as 18 additional inches of rock material over the entire cover might be required. These quantities have not been addressed in either the cost or transportation segments of the EIS or the impacts upon potential borrow areas. Note that for the Crescent Junction site, rock material necessary for both the capillary break and/or a bio-intrusion barrier appears to be available from sources close to these sites or necessary materials could be hauled in by rail to avoid additional truck hauling through Moab.

H. Comments by page number:

Executive Summary, Page S-8 Off-Site Disposal, and second sentence: DOE estimates that the total volume of material to be removed from the site is approximately 11.9 million tons. However, DOE recently provided information that the contaminated soil adjacent, or off-pile, was at least twice the volume used to provide the 11.9-million-ton estimate (i.e., off-pile contaminated soil has increased from 234,000 tons to greater than 500,000 tons). DOE has also used in its projections a contaminated sub-pile soil thickness of only 2 feet (which results in sub-pile amount of 566,000 tons). This thickness and volume was based on limited bore hole data. EPA believes that the sub-pile contaminated thickness is understated significantly and is not supported based on conditions found at other UMTRCA piles. In order to quantify the range of materials for the alternative transportation modes, it would be prudent to use a higher estimate, perhaps up to 13 million tons. This would allow for volumes associated with off-pile contamination and contaminated materials needing removal beneath the pile.

Page S-10 Ground Water Compliance Strategies: The enclosed text indicates that DOE may apply for supplemental standards. Supplemental standards have to be approved by the NRC. Does the NRC support the application of supplemental standards for ground water at this site?

Page S-10; Section 1.4.3 Groundwater Remediation: Last paragraph; Section 2.3.2.2. Implementation of Ground Water Remediation. Figure 2-42; Section 2.3.2.4. Active Remediation Operations; Section 2.6.1. Impacts Affecting the Moab Site and Vicinity Properties….; Table 2-32**.** In each of these sections, the time frame for the on-site alternatives should be expressed as a range (such as from 80 – 1000+ years) to account for the significant uncertainties in the concentrations leaching through the tailings pile and the long time frame the tailings pile is likely to serve as a source of leachate. The 80-year time frame represents with any certainty only the period needed to flush the legacy plumes.

Page S-10 Ground Water Remediation: The second paragraph on this page identifies *ammonia and other site-related constituents*. Please identify the other constituents that have elevated concentrations in the Colorado River adjacent to the site. Are there concentrations or volumes in the pile that could cause excessive environmental damage in either the short-term or long-term scenario?

Page S-12 Disposal Site, Transportation, and Vicinity Property Impacts, *Geology and Soils* Note that the estimate of *approximately 234,000 tons of contaminated site soil* needs to be increased per DOE's subsequent estimates. Please also consider the impact on the amount of soil that would be necessary to reclaim the site. DOE has indicated that 424,867 yds^3 of material would be brought back to the site for reclamation in the event that the pile is moved. Since much of the remaining off-pile contaminated material appears to be at the toe of the pile and/or in levees constructed during operations at the site, does DOE believe this estimate for reclamation is adequate or should this be increased?

Page S-14 Surface Water: DOE states that *the removal of the pile coupled with the estimated 75 years of active ground water remediation would result in permanent protection of surface water quality*. In the next sentence, DOE suggests that equal protection will be provided for the on-site disposal alternative if active ground water remediation continues for an estimated 80 years. DOE should mention the critical assumptions under which this will occur and how this is connected to the designed hydraulic conductivity of the cover of achieving the10^{-8} cm/sec design and how would this time be extended due to the potential effects from a 100-year and or 500-year flood event?

Page S-17 *Cultural Resources:* Because 20 to 25 cultural resource sites potentially impacted with the Klondike and Crescent Junction alternatives are principally due to the slurry pipeline new construction and the new Klondike borrow areas, this summary seems to overstate these cultural resource impacts with respect to both the truck or railroad alternative transport methods.

Page S-19 *Visual Resources:* The newly constructed disposal cell need not necessarily have a strong contrast with the surrounding natural landscape. This will depend on the final cell configuration, the materials used to construct the cover, and other landscaping that DOE employs to mitigate the contrasts. Elsewhere in the EIS it states that the present pile has a moderate contrast with the surrounding landscape. If proper materials are selected, it would appear that the final disposal cell would not be significantly different from the current moderate contrast to visual conditions.

Page S-33 text and Figure S-24 *Borrow Material:* Based on prior experience by EPA staff, we believe the amount of rock riprap and the gravel necessary for construction of an adequate capillary break may be underestimated. The construction of a 6-inch capillary break across the pile may have significant constructability and performance issues. If a bio-intrusion layer were needed, it would also increase the amount of rock required for the on-site cell significantly.

Page S-34 Consequences of estimating cost and impacts, third paragraph: This states that: "DOE has employed reasonable conservatism in characterizing the costs, resources and impacts…" However, the volume of material could be greater, diesel prices may increase, and the schedule may be extended. DOE estimates a total volume of tailings of 11.9 million tons; however, the volume of tailings that was eventually moved at other UMTRCA sites usually exceeded the volume characterized during the planning period by significant percentages. If DOE would use an estimate of 13 million tons to estimate cost for off-site disposal, this might better reflect upon this prior experience**.** Second, diesel fuel prices have increased significantly since the initial draft EIS information was prepared**.** DOE's proposed schedules are optimistic projections. During public presentations, the DOE staff usually identify that its predicted schedules are optimistic and may not be realized. Significant time delays will also increase the overall cost.

Page S-36 Table S-1, Ground Water and Site Conceptual Model Assumptions: A significant uncertainty which needs to be addressed in the Final EIS is the problem of constructing a cap or cover which will retain the necessary hydraulic conductivity over the long term (cover capable of assuring a hydraulic conductivity of less than 10^{-8} cm/sec).

Page S-38 Table S-1, Consequences of underestimating mass and volume of excavated contaminated soil and reclamation soil: DOE states that under the on-site disposal alternative, there would be a commensurate increase in the amount of material to be disposed of in the Moab pile (surcharge). If DOE intends to construct a convex cover with positive drainage, the existing bowl within the concave repository could accommodate the off-pile contaminated materials. As stated previously, there are other reasons to believe that the amounts of material to reclaim the site and construct the repository cover may be significantly underestimated.

Page S-45 Table S-1 Consequences of low cost estimates: The uncertainties of cost projections of each alternative should be highlighted, since the uncertain factors included in this table could result in significant cost changes to each alternative, perhaps on the order of 50 percent greater than the present cost estimates, if the worst case of each uncertain factor did occur.

Page S-47 Major Conclusions, fourth bullet: There are many uncertainties as to whether the construction and performance of the cap-in-place will perform as designed. If the cap fails to perform as designed, this will potentially impact the length of time necessary to remediate the ground water because maintaining the design hydraulic conductivity of the cover over the long term will be difficult to assure.

Page S-47 Major Conclusions, fifth bullet: The way that this statement is worded suggests that the White Mesa Mill already has a cell constructed. While the IUC Corporation has received a permit for a cell suitable for disposal of the Moab tailings, a final cell design may require extensive modifications prior to attaining final approval. The overall impact of constructing the cell at White Mesa and all the ancillary facilities that will be required for the slurry pipeline, coupled with the inherent operational uncertainties of such an endeavor, need to be carefully considered and more thoroughly evaluated prior to selecting this alternative.

Page S-47 Major Conclusions, ninth bullet: EPA concurs with DOE that the "No Action" alternative poses the greatest risk to human health over the long term and exposures to the public at vicinity properties poses the greatest risk. DOE should go forward with clean-up of the vicinity properties at its earliest opportunity independent of any delays associated cap-in-place or moving the tailings to an off-site repository.

Chapter 1.0 Introduction

Page 1-7, Off-Site Disposal Option: We suggest that DOE consider increasing its estimate from 11.9 million tons of contaminated material up to 13 million tons. This will provide a more conservative estimate for purposes of addressing overall costs and the transportation impacts associated with the various alternatives. This is also supported by recent DOE surveys which indicate the off-pile contamination has increased to more than 500,000 tons. It will also account for an increase in the depth of contamination beneath the pile based on similar DOE experience at other UMTRCA sites. The estimated depth of contamination beneath the pile of 2 feet is based on limited borehole data and may not include tailings placed in the hole that resulted from the excavation and construction of the berms that surrounded the original tailings impoundment.

Page 1-8, White Mesa Mill: Perhaps DOE should remove the word *likely* in the statement that reads "…expansion of the existing facility would likely be necessary". Such a statement suggests that the disposal cell necessary for the Moab tailings alternative has already been constructed.

Page 1-10, 4th paragraph, 2nd sentence: With all the unknowns surrounding the selection of an alternative, the transportation mode, and clean-up of the off-pile contamination, the statement that the ground water remediation system will be completed in 2009 or approximately 5 years after issuance of a ROD appears to be optimistic.

Chapter 2.0 Description of Proposed Alternative Actions

Page 2-9, Borrow Material Storage Area: EPA recognizes that this is only a conceptual plan: however; we would question the proposed size of the borrow storage area. Based on the sequencing proposed (i.e., radon barrier, sand and gravel, water storage layer and riprap would all need to be available on site to construct the side slopes), does DOE believe five acres would be a sufficient area based on the quantity of materials necessary to maintain a construction schedule and the size and mobility requirements of the tandem trucks that would be hauling the material to the site?

Page 2-20, Section 2.1.3.1 Borrow Material Standards and Requirements, Riprap: Will 12-inch nominal riprap material be adequate to construct the riprap diversion wall necessary to protect the pile?

Page 2-22 through 2-25, Section 2.1.3.2 Borrow Material Excavation and Transportation Options through Section 2.1.5.2 Equipment: EPA staff provided comments as part of the Cooperative Agency review on the preliminary Draft EIS document, that the number of truck trips, number of trucks, and the number of truck drivers necessary to move borrow materials for reclamation and/or cover materials to the site could not be verified based on the data provided in this section, the accompanying tables and subsequent sections in the EIS. Many of the problems addressed previously still remain in the present draft.

For example, page 2-22 item 4 indicates that approximately 5 trucks would be necessary to haul the borrow material, cover material, and radon barrier material to the site. Elsewhere, Table 2-2 indicates a total of 43 daily round trips are required for the movement of borrow material for the on-site alternative. Table 2-4 Average Annual Labor Requirements indicates that a total of 41 truck drivers are necessary and Table 2-5 indicates that the number of tandem trucks needed to haul borrow materials is 28. These tables and numbers do not appear to be consistent with those presented in Tables 2-16 through 2-21. It is difficult for DOE to establish the costs of the on-site alternative without using consistent sets of information to prepare the project cost estimates.

Page 2-32, Figure 2-13 - Although this is only a schematic, one area proposed for tailings handling raises a potential concern. DOE proposes tailings handling and processing areas within the 100-year floodplain of Moab Wash and the Colorado River (See Appendix D, page D-2). Is it correct that these tailings handling areas will not be lined? The proposed storm control berms and the tailing processing area would be flooded in the 100-year event and perhaps even in a 50-year flood event.

Page 2-49, Figure 2-10 Summary Logistics for Rail Transportation: DOE has estimated there will be 2,188 truckloads of debris which would not be suitable for rail transport because of size constraints and the handling ability of the conveyor belt. Elsewhere in the Draft EIS, the same number of truckloads for transport of debris is used for an off-site alternative, despite the size requirements for transport of particles via the pipeline (i.e., material could not exceed .03 inches in diameter in order to be transported by slurry). What characterization studies have been conducted of the on-site and off-site vicinity property material to substantiate this estimate?

Page 2-51, Line 1 - *question follows up on the comment pertaining to Figure 2-10* - DOE has estimated that approximately 35,000 yd^3 of oversize debris material would need to be hauled by truck to the Crescent Junction or Klondike Flats disposal site. Further on in **Table 2-20, Average Annual Equipment Requirements - Rail Transportation Mode**, **and Table 2-21 Slurry Pipeline Transportation Mode DOE** estimates that 2 to 5 tandem trucks would be required to haul the debris to the Crescent Junction or Klondike Flats sites. Elsewhere (and in a prior response to EPA comments) DOE indicated that debris would be hauled in 16-yd trucks. Please note that these tables need to be changed to reflect 16-yd capacity trucks as stated elsewhere in the document.

Page 2-51, Conveyor System: If rail transportation is going to be successful, the conveyor system and loading facility (hopper at the load-out) will be key pieces of equipment. Assuming continuous operation and the throughput volume of material, the conveyor belt and hopper system will need to have a capacity of approximately 500 tons an hour to sustain a schedule of loading four (4) trains per day. To provide some certainty in the loading of a train, it may require that the hopper have the capacity to fill out a complete car set of 30 cars at 100 tons per car for 3000 tons per train. This information should be included in the Final EIS.

Page 2-52, Klondike Flats Site Rail Construction and Reclamation and Figure 2-22 – The Final EIS should include the explanation that this is a conceptual plan and suggests one possible site configuration for providing access to the Klondike Flats site. Alternate access and egress sites are possible and will need to be evaluated carefully prior to settling upon a final design.

Page 2-77, Soil Rock Admixture Layer - This paragraph indicates that the maximum diameter of the rip-rap material would be 12 inches. However, the intended thickness of the rock admixture layer is only six inches. Although a nominal riprap of 12 inches may be appropriate and constructible for the side-slopes over the buttress, it may not be readily constructible over the cover, nor is it desirable as part of the water storage component of the cover.

Page 2-82 Table 2-17, Average Annual Labor Requirements - Rail Transportation Under the heading 'Transportation Labor', please re-evaluate the need for 3 to 6 truck drivers to haul debris or oversize material. Based on DOE's estimates of the volume of debris that would need to be hauled by truck to the Klondike Flats and Crescent Junction sites, this number of truck drivers appears to be high. However, this number may be appropriate for the White Mesa alternative site because of the time needed to complete each round trip for this significantly longer haul distance.

Page 2-83, Table 2-16, Table 2-17 and Table 2-8 Average Labor Requirements - Slurry Pipeline Transportation: Why will there be a need to increase the Construction Labor Site Support staff under the double-shift scenario for truck or rail haul? This does not seem appropriate for the slurry pipeline alternative since this is presumed to be a continuous 24-hour daily operation. The text and footnotes for these tables should indicate these dual numbers to indicate the difference for a single shift versus the double shift. Wouldn't site support at Moab need to increase by 67 percent in the two ten-hour shift scenario? This increase in labor for site support is not reflected in the tables.

Page 2-88, Table 2-23, Estimated Annual Fuel Consumption The Final EIS should provide greater detail on the consumption of fuel. This section on fuel consumption is not yet fully supported and rather abbreviated. Figure 2-51 on page 2-127 indicates the comparison of fuel consumption by alternative disposal site and transport modes. The information on this figure should be converted into a table and should replace the existing table on page 2-88.

Section 2.3.2.4. Active Remediation Operations, page 2-107 Table 2-31. This table indicates that remediation target goals will be achieved by the on-site alternative after 80 years of operation of the ground water remedy. This appears to be unlikely, given the certainty that the tailings pile will continue to serve as a source of contamination for hundreds to thousands of years. This issue is discussed in some portions of the EIS (e.g., Page 2-109), but it is not fully considered in the discussions regarding the on-site, cap-in-place alternative.

Page 2-125, Visual Resources - There will be strong visual contrasts at the Moab site during the five-year to ten-year construction period for either an on-site or off-site disposal alternative. However, it is not clear why the on-site alternative would have strong adverse impacts to visual resources during the long term. If the existing pile creates a "moderate" contrast as stated in the Draft EIS, then it is very likely that the final pile after 10 or 15 years would also result in being considered a "moderate" contrast. The present emphasis suggests that the contrast following construction of the cap in place would be a 'strong visual contrast.' This degree of visual contrast will be dependent upon the slope of the pile, and the materials utilized (i.e., soils, riprap and vegetation). The Final EIS for this section should include the mitigation measures as addressed in Section 4 regarding reducing the visual contrast.

Page 2-166, Table 2-33 - Consequences of Uncertainty, Item 1 - Ground Water and Site Conceptual Model Assumptions: EPA technical and professional staff concur that there are tremendous uncertainties associated with the ground water and site conceptual models. However, DOE's assessment that without catastrophic events surface water quality would be sustained for 1000 years cannot be assured. This is because the non-catastrophic events also significantly impact surface and ground water in the relatively short term. For example, what are the impacts for the proposed the cover on the tailings pile if it cannot achieve a saturated hydraulic conductivity flux rate of 10^{-8}cm/s? Secondly, we suggest that the 100-year flood should be categorized as a 'catastrophic event.' Based on the recent historical record, there have been at least four such flood events since the 1880's. Such flood events will inundate the toe of the tailings pile and depending on the duration of the flooding, may reintroduce additional contaminants into the ground water plume.

Page 2-167, Table 2-33 Consequences of Uncertainty, Item 2 - Tailings Characteristics (Nonradiation): We concur with the observation regarding uncertainties for average moisture content; however, the Final EIS information should include a discussion of the uncertainties associated with the process of pressing and drying of tailings to meet optimal moisture content for placement and compaction. Once placed into a cell, even if placed at optimal moisture content, transient drainage will continue for perhaps 25 years and if the tailings were to be placed at conditions above the optimal moisture content, then transient drainage from such tailings may extend for longer periods of time. The Mancos Shale beneath the Klondike and Crescent Junction provides much greater protection to surface and ground water than does the White Mesa site. DOE has estimated that the Klondike site and Crescent Junction site would provide ground water protection for upwards of 25,000 years. At the White Mesa site, it is estimated that ground water travel time to points of exposure at surface springs is estimated to be within 3,600 hundred years. A possible discharge point is Ruin Spring located about 2 miles south-southwest of the White Mesa Mill.

Page 2-175, Table 2-33 Consequences of Uncertainty, Item 18 - Salt Layer Migration: DOE acknowledges the possibility that a salt layer exists at some depth in the pile. Modeling has indicated that the layer could reach the ground water in approximately 1,100 years and could continue to impact ground and surface water for 440 years. When these numbers were projected, the saturated hydraulic conductivities and flux were assumed to be 10^{-8} cm/s. What would be the time frame if the saturated hydraulic conductivities and or flux into the tailings were 10^{-6} cm/s? This uncertainty should be discussed and addressed in the Final EIS.

Page 2-175, Table 2-33, Consequences of Uncertainty, and Item 19 Use of Tandem Trucks: The EIS notes that for the tailings haul, there is a question whether permissions from UDOT will be obtained to allow the use of tandem trucks. However, will sand and gravel, riprap and other required reclamation materials for the cap-in-place necessarily be delivered via tandem truck? DOE needs to address these different and uncertain methods of truck hauling into the Final EIS regarding the transport of riprap, borrow material, and sand and gravel. It appears that utilizing trucks that contractors currently have available would be more likely. Recognizing these specific uncertainties will also be consistent with the assumptions utilized in the NRC's EIS regarding this matter.

Chapter 3 Affected Environment

Page 3-9, Millsite Contamination. Please see previous comment regarding the volume of tailings. To properly clarify the range of the expected volume of material, we suggest that the volume of contamination for purposes of projecting impacts use an estimate of 13 million tons. As stated previously, this is probably more realistic based on the recently increased estimates of off-pile contamination and the relatively paucity of data available regarding the depth of contamination under the pile.

Page 3-11, Section 3.1.3.1 Mill site Contamination. The range, as well as average concentrations of contaminants, should be given.

Page 3-61, Section 3.1.15 Visual Resources: Please clarify whether the BLM presently characterizes the Moab site as Class II, or does the pile already cause the site to be classified as Class III? Why do the existing conditions in the Spanish Valley with its residential and commercial development aspects, meet a Class II objective? Recognizing that the valley is presently a Class III visual resource is important for identifying impacts of various alternatives in subsequent impact analysis.

Page 3-58, line 64 and 65 - DOE makes reference to the day/night dBA-weighted sound level which uses a ten-fold or ten-decibel penalty, for night time sound. The Final

EIS should more thoroughly address the night time and potentially sleep-disruptive noise impacts for the community residents along the White Mesa truck haul route, particularly for the double shift haul method.

Page 3-65, Figure 3-21 Transportation Routes and Selected Roads in the Moab to Crescent Junction Area The Final EIS should provide an estimate of traffic into Arches National Park to complete the picture of vehicle traffic in the vicinity of the site. The National Park may have suitably reliable traffic information which can be used to improve the accuracy of the traffic data and Figure 3-21 for this section of US 191. DOE may wish to verify counts, including turning movements along this section of highway, as these conditions must be considered to address the traffic conditions related to truck-haul of the tailings to either Klondike Flats or Crescent Junction sites.

Chapter 4 Environmental Consequences

Section 4.1.3.1.Groundwater, page 4-6, Construction and Operations Impacts at the Moab Site. This section specifically states that the "available information is insufficient to reliably estimate the inventory of soluble mineral salts in the tailings, estimate the time for the salts to be completely depleted, or predict the future geochemical transformations that may occur." However, this seems to be ignored in other sections when discussing the anticipated time frame needed for groundwater remediation in the on-site alternatives.

Section 4.1.4.1 Surface Water, page 4-11, Construction and Operation Impacts at the Moab Site. In the third paragraph of this section, we suggest the sentence: "Surface water concentrations should decrease as well." be deleted based upon our above concerns.

Page 4-12, Section 4.1.4.2 - Impacts from Characterization and Remediation of Vicinity Properties Because human health risks at the vicinity properties is the greatest immediate risks, we are pleased to understand that DOE will begin the remediation of the vicinity properties upon issuance of the ROD.

Page 4-30, Section 4.1.11: DOE has responded adequately to most of EPA's comments regarding visual resources. However, EPA believes that this section should include the statement that "based on the assumption that the BLM Class II objective is not presently met at the Moab site". As stated previously (comments on the preliminary draft) the visual impacts (i.e., strong contrast) would be evident during the major construction phases associated with on-site construction. EPA would agree that strong contrasts would continue for a relatively short period of time (perhaps 3 to 10 years) after remediation was completed and until vegetation was re-established on the side slopes. EPA agrees that overall, a moderate contrast with the surrounding landscape would be expected. Re-contouring of the pile to make it a positive drainage pile may allow DOE to decrease the slopes on the north and east side of the pile and using reddish sandstone and a red-textured soil could further mitigate these visual contrast concerns.

Page 4-43 (Section 4.1.15.1): The document states that the concentration of radon at the Maximally Exposed Individual is 1.9 pCi/l. Is this an indoor or outdoor sample? If it is indoor, this is the average concentration in a home. If this is an outdoor reading, this concentration combined with seepage into the structure from the local terrain could result in the structure exceeding the 40 CFR 192.12(b)(1) 0.02 WL or 0.03 WL standards. Please specify the location of the sample in the Final EIS.

Page 4-44, (Section 4.1.15.2): The section states that the EPA remediation standard for vicinity properties is 0.02 WL (or about 3 pCi/l). The actual EPA standard is that the responsible party must make a reasonable effort not to exceed an annual average of 0.02 WL, and in any case, not exceed 0.03 WL (see 40 CFR 192.12(b)(1)). Also, EPA assumes an ER of 0.5 in residential homes, which means that 0.02 WL is about 4pCi/l, and not 3 pCi/l as stated in the DOE's Draft DEIS. The way the paragraph is structured, it implies that the risks stated are EPA conclusions. The Final EIS should clarify that these numbers are not exactly consistent with EPA's risk assessments pursuant to 40 CFR 192 or these estimates of risk should be changed to the risk levels as specifically discussed in the 40 CFR 192 EIS. See the discussion on Appendix D that follows.

Page 4-48, (Table 4-14): The risk assessment should include a guide and local rafter which have potentially longer exposure times than this camper-assumption procedure. See the discussion on Appendix D that follows.

Page 4-54 & 55, (Section 4.1.17): The impacts predicted by the model for cell failure due to natural phenomenon, appears to result in excessive risks and the assumptions used are not clear. For example, the document provides the Avolume@ of the tailings in Atons@ and claims that 25% of this Avolume@ is pore water. It is not clear how to calculate the volume of pore water to understand if the model predictions remain plausible. To check the predictions, EPA staff used information obtained from the Moab Project Site Groundwater Subcommittee Minutes, July 12, 2002, which states that the pile initially contained 15 million gallons of leachate (Minutes at page 7.) Given that the assumptions used that the erosion of the pile could occur over a 10-hour period and assuming <u>all</u> the pore water escapes, the pore water flow rate would be 56 cubic feet cfs. The model assumed this river flow during such a failure event would be 150,000 cfs. It is not clear how mixing a 56 cfs fluid at 6.63 mg/L uranium with 150,000 cubic feet per second (cfs) river flow at background concentration of about 0.008 mg/L uranium, would result in a final mixture of 1 mg/L uranium at a 20% release or 4 mg/L at an 80% release. We understand there would be some leaching of uranium from the solids within the pile, but given the short time of this rapid event and the volume of river water that would be exposed to the tailings, this contribution would seem to be negligible compared to the pore water.

Similar inconsistencies appear to exist for the estimated concentrations shown in Tables 4-18 and 4-19. The contamination levels are a few thousand pCi/g, yet the average Ra-226 concentration is 516 pCi/g in the pile. Based on the data provide in the 40 CFR 192 EIS, uranium mill slimes have about twice the Ra-226 concentration as sands (pg 18), so it is not clear how such significantly higher Ra-226 concentrations at 3,776 pCi/g would exist.

Page 4-87, 4.2.14 Socioeconomics: This section and the section which addresses socioeconomics for the Crescent Junction site need to reflect that the economic benefits of this project are short-lived and many of the economic benefits that DOE projects, (e.g., annual expenditures and labor earnings) will occur outside the two county region extending into Carbon and Emery Counties in Utah and Mesa County in Colorado. In particular, DOE must address either in section **4.2.14 Socioeconomic** analysis for Klondike and **4.3.14 Socioeconomic** analysis for Crescent Junction or in **Table 2-33 Consequences of Uncertainty** that should the alternative selected be an off site alternative north of Moab, a significant portion of the potential socioeconomic impacts (i.e., employment multipliers) may shift to Carbon and Emery Counties and Mesa County, Colorado.

Page 7-5, (Section 7.1.11): This seems to indicate that NESHAP requirements do not apply during active remediation. The section states that 40 CFR 61 Subpart Q applies only after final disposal and that NESHAP requirements do not apply during periods of active remediation. Subpart Q regarding designation of facilities lists which facilities need to apply Subpart Q and since this is a Title I site under UMTCA, 40 CFR 61.190, this subpart does not apply. However, Subpart T of NESHAP requirements would be applicable two years after the site has become inactive (See 40 CFR 61.220 and 61.222 (b)). (The Moab Uranium Mill tailings pile has been inactive and under DOE's authority for longer than two years.) The Subpart T rule states that such tailings piles are required to meet the 20 pCi/m^2-s Rn-222 flux standard <u>unless</u> a compliance agreement is reached because it is not physically possible for the owner or operator to complete disposal within the two-year time frame. DOE=s preparation of the Final EIS and the eventual ROD would satisfy the latter condition. It should also be mentioned in this paragraph that DOE is presently following the radon guidelines in DOE Order 5400.5 as described in the Moab Annual Site Environmental Report (DOE-EM/GJ677-2004).

Appendix A

Page A1-2 Figure A1-2 Typical Cross Section of the Disposal Cell, On-Site Disposal Alternative. The proposed figure illustrates a water storage cover and suggests a capillary break design of 6 inches. Will a 6-inch thick capillary break over the aerial extent of the pile (i.e., 130 plus acres) be sufficient? Does DOE feel confident that pile subsidence (differential settlement resulting from dewatering activities) and regional subsidence within the Moab Valley (due to salt dissolution) is likely to be evenly distributed to maintain the integrity of a 6-inch capillary break layer over the 200 to 1000-year life of the pile as required under 40 CFR Part 192?

Page A1-7 Last Paragraph. DOE indicates that it would remove tamarisk trees and replace that vegetation with native riparian species that would be of "higher functional value for wildlife." In view of the USGS sediment transport modeling results, what species would be planted to provide greater bank stability? Is it likely that a native species, such as southwestern willow, can out-compete the tamarisk even after tamarisk removal? What measures will DOE take to minimize disturbance of vegetated areas at the Moab site during remediation efforts for either the on-site or off-site alternatives?

Appendix B Assumed Disposal Cell Cover Conceptual Design and Construction:

Page B-5, B4.0: DOE should consider conducting further evaluation of the proposed cover at White Mesa based on experience gained in its long-term surveillance and maintenance responsibilities for the UMTRCA Title I sites, as well as the recent design and construction of the Monticello Mill Tailings site. In the document, DOE noted that the NRC had approved the cell designs. However, NRC had previously approved the cell design at Moab and later required that the Atlas Corporation submit a revised closure plan. If a decision is made to relocate the tailings to White Mesa, specifically, what studies will DOE conduct to make certain that the proposed cover at White Mesa is acceptable? These would need to be addressed in the Final EIS.

Appendix D, Human Health

We recommend that a revised Appendix D address a rafter guide and a frequent local rafter that may recreate on the river below the site to address potential human health risk scenarios.

Radium in soils: When establishing the *Health and Environmental Protection Standards for Uranium and Thorium Mill tailings* (40 CFR 192), the primary Contaminant of Concern (COC) was identified as radon gas produced from the decay product of Ra-226. EPA's 40 CFR 192 EIS evaluated the risk for multiple alternatives including the "no action" alternative and the standards presently applicable to the Moab Uranium Mill Tailings. The results based on using the 40 CFR 192 EIS risk assessment method and that shown by DOE for the Moab tailings risk assessment are significantly different. For example, in Section D3.4 of the Appendix it is assumed that after the site has been remediated, clean surface soils are imported and there are no longer risks from either radon or gamma exposure. If the DOE were to excavate <u>all</u> soils down to background conditions for the primary COC, the additional risk to an on-site resident would be zero as stated in Table D-12 for an adult and stated in Table D-13 for a child. If the DOE plans to use the 5 -15 Pico-Curies per gram (pCi/g) limit established in 40 CFR 192.12, then the residential risk could be 2 in 100 (40 CFR 192 EIS; Table 7-2, pg 110 alternative L2). The reason the risk exceeds the 10^{-4} risk limit is that Ra-226 is prevalent in uncontaminated soils, hence EPA established a standard near background as opposed to the conventional 10^{-6} to 10^{-4} range. To illustrate this, the 5 -15 pCi/g standard is designed to bring the <u>average</u> concentration value below a residential structure down to 5 pCi/g. Assuming linear behavior, to reduce the risk from 2 in 100 down to 10^{-4}, the average value for radium would have to be as low as 0.025 pCi/g. But noting that the average background concentration of Ra-226 throughout the Colorado Plateau is about 2 pCi/g, establishing a risk based standard would result in a cleanup level 80 times less than background.

For the capped pile, Appendix D should note that the 20 pCi/m^2-s standard is considered protective for all but the residential alternative (40 CFR 192 EIS, pg 119).

The Appendix should summarize the 40 CFR 192 EIS risk conclusions and simply reference EPA's 40 CFR 192 EIS. For the no-action alternative, the appendix should use the 'rule-of-thumb' contained in the 40 CFR 192 EIS:

5pCi/g average below a structure (the 5 -15 standard) = 0.02 WL in a structure equals 2 in100 risk

Contaminated surface waters: The analysis contained in this appendix only considers water ingestion in the camping scenario. Two other likely exposure scenarios should be addressed for completeness. As mentioned on page 23 of The National Academy of Science report of June 11, 2002, rafting guides are likely to have the highest exposure risk for publicly accessed areas. In addition to the guide, a local recreational frequent rafter could also receive a significantly higher exposure than a camper.

For the guide, we can assume this person:

Works 5 days per week for 5 months per year for 6 years (for example, a college student working part time);
Takes two trips per day; and
Swallows 1 Tablespoon (14.8 ml) of contaminated water per trip.

This would result in the consumption of 17.8 liters of contaminated water. In the camping scenario, the DOE assumed 2 liters consumed for one day resulted in a 10^{-7} risk. So using the conservative values above, a guide consuming about 10 times the water of a camper would be exposed at the 10^{-6} risk range. For a local and frequent resident rafter, we can assume one (1) trip per week for 5 months, over 30 years. Assuming the same ingestion rate, 8.9 liters would be consumed. This would be below the 10^{-6} risk range.

Appendix G White Mesa Mill Operations, G3.0 Facility

EPA understands that the current liner in Cell 4A is being removed and this cell will be reconstructed with a double liner based on commitments made by IUC to the Utah Department of Environmental Quality. What is the likelihood, now that regulatory authority has transferred from NRC to the Utah Department of Environmental Quality, that cell 4B (the proposed wet cell to handle the tailings slurried from the Moab site), and cell 5 (proposed to be the final repository for the Moab tailings) will also be required to be similarly lined? Is the DOE working with UDEQ to determine how the transfer of regulatory jurisdiction from the NRC to UDEQ might affect the design of the cell and the overall cost of a White Mesa disposal alternative?

Appendix H

Page H-4, H2.1 Transportation Accident Rates, Table H-2 Utah Specific Accident and Fatality Rates: DOE has utilized Utah specific accident rates taken from data provided in Saricks and Tompkins for rail and heavy combination trucks. Are the truck accident rates based on a statewide average or are they based specifically on accident rates along US 191? If a statewide accident rate for state highways was utilized, did DOE check accident rates provided or available from the Utah Department of Transportation to determine if US 191 had comparable rates? Has the DOE requested any information on locations or segments of any of the haul routes which have significantly greater accident incident rates than might be expected on such highways?